Photochemistry and Photobiology

The official journal of the American Society for Photobiology • Volume 75 • No. 1 • January 2002

iii Focus

PHOTOCHEMISTRY, PHOTOPHYSICS AND PHOTOTECHNOLOGY

1 A new model using liposomes that allow to distinguish between absorption and oxidative properties of sunscreens

Christian Tran, Olivier Sorg, Pierre Carraux, Liliane Didierjean, Georges Siegenthaler, Françoise Falson, Jean-Hilaire Saurat

6 Effects of surfactants on the photosensitized production of tyrosine radicals studied by photo-CIDNP

J. J. Lopez, M. A. G. Carter, Yu P. Tsentalovich, O. B. Morozova, A. V. Yurkovskaya, P. J. Hore

11 Excited-state properties and *in vitro* phototoxicity studies of three phenothiazine derivatives

Fausto Elisei, Loredana Latterini, Gian Gaetano Aloisi, Ugo Mazzucato, Giampietro Viola, Giorgia Miolo, Daniela Vedaldi, Francesco Dall'Acqua

PHOTOSYNTHESIS AND BIO/CHEMILUMINESCENCE

22 Two bioluminescent diptera: The North American *Orfelia fultoni* and the Australian *Arachnocampa flava*. Similar niche, different bioluminescence systems

Vadim R. Viviana, J. Woodland Hastings, Thérèse Wilson

PHOTOMEDICINE

28 Intracellular photobleaching of 5,10,15,20-tetrakis (*m*-hydroxyphenyl) chlorin (Foscan®) exhibits a complex dependence on oxygen level and fluence rate

Lars Kunz, Alexander J. MacRobert

36 Involvement of oxidative stress in NF-κB activation in endothelial cells treated by photodynamic therapy

Cédric Volanti, Jean-Yves Matroule, Jacques Piette

46 Mechanisms of reduced human vascular cell migration after photodynamic therapy

Peter R. Waterman, Marcus Overhaus, Joerg Heckenkamp, Giuseppe R. Nigri, Patrick F. C. Fungaloi, Michael E. Landis, Sylvie C. Kossodo, Glenn M. LaMuraglia

51 Rapid control of wound infections by targeted photodynamic therapy monitored by *in vivo* bioluminescence imaging

Michael R. Hamblin, David A. O'Donnell, Naveen Murthy, Christopher H. Contag, Tayyaba Hasan

58 Stage-specific alterations of cyclin expression during ultraviolet UVB-induced murine skin tumor development

Arianna L. Kim, Mohammad Athar, David R. Bickers, Jean Gautier

68 UVB-activated psoralen reduces luminal narrowing after balloon dilation because of inhibition of constrictive remodeling

Jop Perrée, Ton G. van Leeuwen, Evelyn Velema, Mirjam Smeets, Dominique de Kleijn, Cornelius Borst

PHOTOSENSORY AND CIRCADIAN BIOLOGY

76 A rhodopsin-like protein in the plasma membrane of *Silvetia compressa* eggs

Paolo Gualtieri, Kenneth R. Robinson

79 The opposed effect of 5-azacytidine and light on the development of reproductive structures in *Neurospora crassa*

Mikhail S. Kritsky, Vincenzo E. A. Russo, Svetlana Yu. Filippovich, Tatiana P. Afanasieva, Galina P. Bachurina

Photochemistry and Photobiology

The official journal of the American Society for Photobiology • Volume 75 • No. 2 • February 2002

iii Focus

PHOTOCHEMISTRY, PHOTOPHYSICS AND PHOTOTECHNOLOGY

85 Chlorella virus pyrimidine dimer glycosylase excises ultraviolet radiation– and hydroxyl radical–induced products 4,6-diamino-5-formamidopyrimidine and 2,6-diamino-4-hydroxy-5-formamidopyrimidine from DNA

Pawel Jaruga, Ritche Jabil, Amanda K. McCullough, Henry Rodriguez, Miral Dizdaroglu, R. Stephen Lloyd

92 Inhibiting effect of β-cyclodextrin on thymine dimerization photosensitized by para-aminobenzoic acid

Maria Nowakowska, Mirosław Grębosz, Mirosława Smoluch, Wiktor Tatara

97 Photobiological properties of hydroxy-substituted flavothiones

Marta Borges, Ana Romão, Olívia Matos, Christine Marzano, Sergio Caffieri, Ralph S. Becker, António L. Maçanita

107 Photophysical and photochemical studies of 2-phenylbenzimidazole and UVB sunscreen 2-phenylbenzimidazole-5-sulfonic acid

J. Johnson Inbaraj, Piotr Bilski, Colin F. Chignell

117 Sensitization of lanthanides by nonnatural amino acids

John D. Brennan, Alfredo Capretta, Kelvin Yong, David Gerritsma, Kulwinder K. Flora, Amy Jones

ENVIRONMENTAL PHOTOBIOLOGY AND UVR EFFECTS

122 The effect of UV absorbing sunscreens on the reflectance and the consequent protection of skin

Gerald J. Smith, Ian J. Miller, John F. Clare, Brian L. Diffey

PHOTOSYNTHESIS AND BIO/CHEMILUMINESCENCE

126 Proton uptake of *Rhodobacter Capsulatus* reaction center mutants modified in the primary quinone environment

Julia Tandori, Jaroslava Miksovska, Marielle Valerio-Lepiniec, Marianne Schiffer, Peter Maróti, Deborah K. Hanson, Pierre Sebban

PHOTOMEDICINE

134 Enhancement of lysosomal osmotic sensitivity induced by the photooxidation of membrane thiol groups

Feng-Yi Wan, Lu Yang, Yi-Gang Zhong, Wen Zhu, Yi-Nan Wang, Guo-Jiang Zhang

140 In vitro and in vivo efficacy of Photofrin® and pheophorbide a, a bacteriochlorin, in photodynamic therapy of colonic cancer cells

A. Hajri, S. Wack, C. Meyer, M. K. Smith, C. Leberquier, M. Kedinger, M. Aprahamian

149 Laser targeted photo-occlusion of rat choroidal neovascularization without collateral damage

Hirokazu Nishiwaki, Ran Zeimer, Morton F. Goldberg, Salvatore A. D'Anna, Stanley A. Vinores, Rhonda Grebe

159 Mitochondrial alterations in Fanconi anemia fibroblasts following ultraviolet A or psoralen photoactivation

Solange Rousset, Silvano Nocentini, Danièlle Rouillard, Christiane Baroche, Ethel Moustacchi

167 Relation between K^+ leakage and damage to band 3 in photodynamically treated red cells

Laurence L. Trannoy, Anneke Brand, Johan W. M. Lagerberg

172 Systemic component of protoporphyrin IX production in nude mouse skin upon topical application of aminolevulinic acid depends on the application conditions

Johanna T. H. M. van den Akker, Vladimir Iani, Willem M. Star, Henricus J. C. M. Sterenborg, Johan Moan

PHOTOSENSORY AND CIRCADIAN BIOLOGY

178 Identification of a light-regulated protein kinase activity from seedlings of *Arabidopsis thaliana*

Przemyslaw Malec, Avital Yahalom, Daniel A. Chamovitz

184 The role of A2E in prevention or enhancement of light damage in human retinal pigment epithelial cells

Joan E. Roberts, Barbara M. Kukielczak, Dan-Ning Hu, David S. Miller, Piotr Bilski, Bob Sik, Ann G. Motten, Colin F. Chignell

ERRATUM

191 Novel Findings Regarding Photoinduced Commitments of G1-, S- and G2-phase Cells to Cell-cycle Transitions in Darkness and Dark-induced G1-, S- and G2-phase Arrests in *Euglena*

Shin-ya Hagiwara, Masayuki Takahashi, Akihiko Yamagishi, Yulan Zhang, Ken Goto

Photochemistry and Photobiology

The official journal of the American Society for Photobiology • Volume 75 • No. 3 • March 2002

iii Focus

PHOTOCHEMISTRY, PHOTOPHYSICS AND PHOTOTECHNOLOGY

193 A laser flash photolysis study of fenofibric acid in aqueous buffered media: Unexpected triplet state inversion in a derivative of 4-alkoxybenzophenone
Gonzalo Cosa, S. Purohit, J. C. Scaiano, Francisco Boscá, Miguel A. Miranda

201 Fluorescent properties of oligonucleotide-conjugated thiazole orange probes
Eric Privat, Tracy Melvin, Fabienne Mérola, Gerd Schweizer, Sylvie Prodhomme, Ulysse Asseline, Paul Vigny

211 Kinetic analysis of a photosensitive chelator and its complex with Zn(II)
Melinda R. Stephens, Caroline D. Geary, Stephen G. Weber

221 Reverse intersystem crossing in rose bengal. II. Fluence dependence of fluorescence following 532 nm laser excitation
John M. Larkin, William R. Donaldson, Robert S. Knox, Thomas H. Foster

229 Self-association of disulfonated deuteroporphyrin and its esters in aqueous solution and photosensitized production of singlet oxygen by the dimers
Julien Dairou, Christine Vever-Bizet, Daniel Brault

237 Spectroscopic properties of fluoroquinolone antibiotics in water–methanol and water–acetonitrile mixed solvents
Hyoung-Ryun Park, Chu-Ha Oh, Hyeong-Chul Lee, Jin-Ki Lee, Kiyull Yang, Ki-Min Bark

249 Synthesis, spectra and photophysics of some free base tetrafluoroaryl and tetrafluoraryl porphyrins with potential applications in imaging
J.C.P. Grancho, M.M. Pereira, M. da G. Miguel, A.M. Rocha Gonsalves, H.D. Burrows

ENVIRONMENTAL PHOTOBIOLOGY AND UVR EFFECTS

257 Development and application of a novel immunoassay for measuring oxidative DNA damage in the environment
David L. Mitchell, Jarah Meador, Laxmi Paniker, Didier Gasparutto, Wade H. Jeffrey, Jean Cadet

266 Seasonal fluctuation of DNA photodamage in marine plankton assemblages at Palmer Station, Antartica
Jarah Meador, Wade H. Jeffrey, Jason P. Kase, J. Dean Pakulski, Stephanie Chiarello, David L. Mitchell

PHOTOSYNTHESIS AND BIO/CHEMILUMINESCENCE

272 Assessing carotenoid content in plant leaves with reflectance spectroscopy
Anatoly A. Gitelson, Yoav Zur, Olga B. Chivkunova, Mark N. Merzlyak

PHOTOMEDICINE

282 *In vivo* mTHPC photobleaching in normal rat skin exhibits unique irradiance-dependent features
Jarod C. Finlay, Soumya Mitra, Thomas H. Foster

289 Relationship between mTHPC fluorescence photobleaching and cell viability during *in vitro* photodynamic treatment of DP16 cells
Jonathan S. Dysart, Michael S. Patterson, Thomas J. Farrell, Gurmit Singh

296 Treatment of murine cutaneous melonoma with near infrared light
C. Dees, J. Harkins, M.G. Petersen, W.G. Fisher, E.A. Wachter

302 UVA irradiation–induced activation of activator protein-1 is correlated with induced expression of AP-1 family members in the human keratinocyte cell line HaCaT
Amy L. Silvers, G. Timothy Bowden

311 Cloning and characterization of an active fragment of luciferase from a luminescent marine alga, *Pyrocystis lunula*
Hisashi Morishita, Sayumi Ohashi, Takashi Oku, Yoshihiro Nakajima, Satoshi Kojima, Masayuki Ryufuku, Hideshi Nakamura, Yoshihiro Ohmiya

316 Mass spectrometric analysis of porcine rhodopsin
Zsolt Ablonczy, Patrice Goletz, Daniel R. Knapp, Rosalie K. Crouch

PHOTOSENSORY AND CIRCADIAN BIOLOGY

322 Spectral shift of ultraweak photon emission from sweet potato during a defence response
Hiroyuki Iyozumi, Kimihiko Kato, Takahiro Makino

Photochemistry and Photobiology

The official journal of the American Society for Photobiology • Volume 75 • No. 4 • April 2002

iii Focus

PHOTOCHEMISTRY, PHOTOPHYSICS AND PHOTOTECHNOLOGY

327 Fluorescence quantum yields and their relation to lifetimes of Rhodamine 6G and fluorescein in nine solvents: Improved absolute standards for quantum yields

Douglas Magde, Roger Wong, Paul G. Seybold

335 In vitro investigation on the pH-dependence of the absorption and fluorescence properties of the photosensitizer mTHPC

Andreas Zimmermann, Monika Ritsch-Marte, Herwig Kostron

339 Photochemical electron transfer reactions of tirapazamine

James S. Poole, Christopher M. Hadad, Matthew S. Platz, Zachary P. Fredin, Laura Pickard, Elisa Levya Guerrero, Margarita Kessler, Goutam Chowdhury, Delshanee Kotandeniya, Kent S. Gates

346 Photochemistry and phototoxicity of aloe emodin

Peter Vath, Wayne G. Wamer, Daniel E. Falvey

353 Singlet molecular oxygen quenching ability of carotenoids in a reverse-micelle membrane mimetic system

Mariana A. Montenegro, Mónica A. Nazareno, Edgardo N. Durantini, Claudio D. Borsarelli

362 The light induced reactions of tryptophan with halocompounds

Robert A. Edwards, Glen Jickling, Raymond J. Turner

ENVIRONMENTAL PHOTOBIOLOGY AND UVR EFFECTS

369 Estimation of pedestrian level UV exposure under trees

Richard H. Grant, Gordon M. Heisler, Wei Gao

PHOTOSYNTHESIS AND BIO/ CHEMILUMINESCENCE

377 Relationship between the structural and functional changes of the photosynthetic apparatus during chloroplast-chromoplast transition in flower bud of Lilium longiflorum

Philippe Juneau, Pascaline Le Lay, Béla Böddi, Guy Samson, Radovan Popovic

PHOTOMEDICINE

382 Direct near-infrared luminescence detection of singlet oxygen generated by photodynamic therapy in cells in vitro and tissues in vivo

Mark Niedre, Michael S. Patterson, Brian C. Wilson

392 In vitro photodynamic activity of a series of methylene blue analogues

Kirste J. Mellish, Russell D. Cox, David I. Vernon, John Griffiths, Stanley B. Brown

398 Monitoring photoproduct formation and photobleaching by fluorescence spectroscopy has the potential to improve PDT dosimetry with a verteporfin-like photosensitizer

Haishan Zeng, Mladen Korbelik, David I. McLean, Calum MacAulay, Harvey Lui

406 Photodynamic effects of mTHPC on human colon adenocarcinoma cells: Photocytotoxicity, subcellular localization and apoptosis

W. N. Leung, X. Sun, N. K. Mak, C. M. N. Yow

412 Platelet adhesion to photodynamic therapy treated extracellular matrix proteins

Patrick Fungaloi, Randolph Statius van Eps, Ya-Ping Wu, Jan Blankensteijn, Phillip de Groot, Hero van Urk, Richard van Hillegersberg, Glenn LaMuraglia

418 Quantification of topically delivered 5-aminolevulinic acid by iontophoresis across ex vivo human stratum corneum

Harry E. Boddé, Peter E. H. Roemelé, Willem M. Star

424 Quantitative model calculation of the time dependent protoporphyrin IX concentration in normal human epidermis after delivery of ALA by passive topical application or iontophoresis

Willem M. Star, Maurice C. G. Aalders, Arnoldo Sac, Henricus J. C. M. Sterenborg

RAPID COMMUNICATIONS

433 Spectral heterogeneity in single light-harvesting chlorosomes from green sulfur photosynthetic bacterium Chlorobium tepidum

Yoshitaka Saga, Tetsuichi Wazawa, Tadashi Mizoguchi, Yoshiharu Ishii, Toshio Yanagida, Hitoshi Tamiaki

Photochemistry and Photobiology

The official journal of the American Society for Photobiology • Volume 75 • No. 5 • May 2002

iii Focus

INVITED REVIEW

437 Photogenotoxicity of mammalian cells: A review of the different assays for *in vitro* testing

Jean-Roch Meunier, Alain Sarasin, Laurent Marrot

PHOTOCHEMISTRY, PHOTOPHYSICS AND PHOTOTECHNOLOGY

448 Intra and intermolecular electronic relaxation of the second excited singlet and the lowest excited triplet states of 1,3-dimethyl-4-thiouracil in solution

Katarzyna Taras-Goślińska, Grażyna Wenska, Bohdan Skalski, Andrzej Maciejewski, Gotard Burdziński, Jerzy Karolczak

457 New triruthenium clusters as photoinduced DNA-binding and cleaving agents

Jih Ru Hwu, Kuang-Lieh Lu, Sheng-Fa Yu, Lee-Ju Yu, Sudalaiandi Kumaresan, Kuan-Jiun Lin, Shwu-Chen Tsay

462 Photophysical properties and antibacterial activity of meso-substituted cationic porphyrins

Elena Reddi, Mara Ceccon, Giuliana Valduga, Giulio Jori, Jerry C. Bommer, Fausto Elisei, Loredana Latterini, Ugo Mazzucato

471 Prediction of tumoricidal activity and accumulation of photosensitizers in photodynamic therapy using multiple linear regression and artificial neural networks

R. Vanyúr, K. Héberger, I. Kövesdi, J. Jakus

479 Spectroscopic characterization of flavin mononucleotide bound to the LOV1 domain of Phot1 from *Chlamydomonas reinhardtii*

W. Holzer, A. Penzkofer, M. Fuhrmann, P. Hegemann

488 The effect of pH and surfactant on the aggregation behavior of chlorin p_6: A fluorescence spectroscopic study

Anindya Datta, Alok Dube, Beena Jain, Arjun Tiwari, Pradeep Kumar Gupta

ENVIRONMENTAL PHOTOBIOLOGY AND UVR EFFECTS

495 Antiapoptotic effects induced by different wavelengths of ultraviolet light

Yuko Ibuki, Rensuke Goto

503 Divergent optimum levels of lycopene, β-carotene and lutein protecting against UVB irradiation in human fibroblasts

Olaf Eichler, Helmut Sies, Wilhelm Stahl

507 Modulation of base excision repair alters cellular sensitivity to UVA1, but not to UVB

Katherine J. Kim, Indraneel Chakrabarty, Guang-Zhi Li, Sabine Grösch, Bernd Kaina, Thomas M. Rünger

PHOTOSYNTHESIS AND BIO/CHEMILUMINESCENCE

513 Photodynamic effect of iron excess on photosystem II function in pea plants

Hwa-Jin Suh, Chang Sook Kim, Ji-Yeun Lee, Jin Jung

519 Photothermal monitoring of redox state of respiratory chain in single live cells

Dmitri Lapotko, Tat'yana Romanovskaya, Elena Gordiyko

PHOTOMEDICINE

527 Chelation with metal is not essential for antitumor photodynamic activity of sulfonated phthalocyanines

Alexei Feofanov, Alexei Grichine, Tatyana Karmakova, Natalia Kazachkina, Elena Pecherskih, Raisa Yakubovskaya, Eugene Luk'yanets, Valentina Derkacheva, Marguerite Egret-Charlier, Paul Vigny

534 Electrically enhanced percutaneous delivery of δ-aminolevulinic acid using electric pulses and a DC potential

Patricia G. Johnson, Sek Wen Hui, Allan R. Oseroff

541 UVB exposure impairs immune responses after hepatitis B vaccination in two different mouse strains

Annemarie Sleijffers, Johan Garssen, Frank R. de Gruijl, Greet J. Boland, Jan van Hattum, Willem A. van Vloten, Henk van Loveren

PHOTOSENSORY AND CIRCADIAN BIOLOGY

547 Evidence for a circadian rhythm of susceptibility to retinal light damage

Dana K. Vaughan, Jenny L. Nemke, Steven J. Fliesler, Ruth M. Darrow, Daniel R. Organisciak

554 Phytochromes with noncovalently bound chromophores: The ability of apophytochromes to direct tetraphyrrole photoisomerization

Helena J. M. M. Jorissen, Benjamin Quest, Ingo Lindner, Nicole Tandeau de Marsac, Wolfgang Gärtner

Photochemistry and Photobiology

The official journal of the American Society for Photobiology • Volume 75 • No. 6 • June 2002

iii Editorial

PHOTOCHEMISTRY, PHOTOPHYSICS AND PHOTOTECHNOLOGY

561 Binding affinities of commonly employed sensitizers of viral inactivation
Nathalie Dardare, Matthew S. Platz

565 Formation of singlet oxygen by urocanic acid by UVA irradiation and some consequences thereof
Elton L. Menon, Harry Morrison

570 Heterogeneity of diffusion inside microbial biofilms determined by fluorescence correlation spectroscopy under two-photon excitation
E. Guiot, P. Georges, A. Brun, M. P. Fontaine-Aupart, M. N. Bellon-Fontaine, R. Briandet

579 Photoinduced transannular reaction of 1,3-dimethyl-cyclooctapyrimidine-2,4-diones
Kazue Ohkura, Koh-ichi Seki

585 Protective effect of boldo and tea infusions on the visible light–mediated pro-oxidant effects of vitamin B_2, riboflavin
E. Silva, M. Jopia, A. M. Edwards, E. Lemp, J. R. De la Fuente, E. Lissi

591 The quenching of CdSe quantum dots photoluminescence by gold nanoparticles in solution
Babak Nikoobakht, Clemens Burda, Markus Braun, Man Hun, Mostafa A. El-Sayed

ENVIRONMENTAL PHOTOBIOLOGY AND UVR EFFECTS

598 Modifications of *in vitro* skin penetration under solar irradiation: Evaluation on flow-through diffusion cells
Christelle Gélis, Alain Mavon, Maxence Delverdier, Nicole Paillous, Patricia Vicendo

PHOTOSYNTHESIS AND BIO/CHEMILUMINESCENCE

605 Light- and redox-dependent thermal stability of reaction center of the photosynthetic bacterium *Rhodobacter sphaeroides*
Zsolt Tokaji, Júlia Tandori, Péter Maróti

613 Photoinhibition *in vivo* and *in vitro* involves weakly coupled chlorophyll–protein complexes
Stefano Santabarbara, Ilaria Cazzalini, Andrea Rivadossi, Flavio M. Garlaschi, Giuseppe Zucchelli, Robert C. Jennings

619 Self-assembly of [Et,Et]-bacteriochlorophyll c_F on highly oriented pyrolytic graphite revealed by scanning tunneling microscopy
H. Möltgen, K. Kleinermanns, A. Jesorka, K. Schaffner, A. R. Holzwarth

PHOTOMEDICINE

627 DNA and protein changes caused by disease in human breast tissues probed by the Kubelka–Munk spectral function
Yuanlong Yang, Edward J. Celmer, Jason A. Koutcher, R. R. Alfano

633 Near-infrared photosensitizer based on a cycloimide derivative of chlorin p6: 13,15-*N*-(3′-hydroxypropyl)cycloimide chlorin p6
Alexei Feofanov, Alexei Grichine, Tatyana Karmakova, Anna Pljutinskaya, Victoria Lebedeva, Anna Filyasova, Raisa Yakubovskaya, Andrei Mironov, Marguerite Egret-Charlier, Paul Vigny

644 Photodynamic therapy with pyropheophorbide-*a* methyl ester (MPPa) in human lung carcinoma cancer cell: Efficacy, localization and apoptosis
X. Sun, W. N. Leung

652 The peripheral benzodiazepine receptor in photodynamic therapy with the phthalocyanine photosensitizer Pc 4
Rachel L. Morris, Marie E. Varnes, Malcolm E. Kenney, Ying-Syi Li, Kashif Azizuddin, Maureen W. McEnery, Nancy L. Oleinick

662 Tuning up or down the UV-induced apoptosis in Chinese hampster ovary cells with cell cycle inhibitors
Bor-Show Tzang, Yun-Jung Chiang, Hsin-Chieh Lan, Chu-Bin Liao, Yin-Chang Liu

PHOTOSENSORY AND CIRCADIAN BIOLOGY

668 Photoreduction of bacteriorhodopsin Schiff base at low humidity. A study with C_{13}=C_{14} nonisomerizable artificial pigments
Amir Aharoni, Michael Ottolenghi, Mordechai Sheves

675 Regulation of cAMP-mediated photosignaling by a phytochrome in the cyanobacterium *Anabaena cylindrica*
Masayuki Ohmori, Kazuki Terauchi, Shinobu Okamoto, Masakatu Watanabe

680 The damage repair role of He–Ne laser on plants exposed to different intensities of ultraviolet-B radiation
Zhi Qi, Ming Yue, Rong Han, Xun-Ling Wang

v Contents, Vol. 75

xiii Author Index, Vol. 75

xvi Subject Index, Vol. 75